(1) under 35 U.S.C. §112, first paragraph, as drawn to subject matter not described in the specification in such a way as to reasonably convey that the inventor(s) has possession of the claimed invention at the time of filing (claims 1-12, 25, 26, and 28-30);

(2) under 35 U.S.C. §112, second paragraph, as indefinite (claims 1-12, 25, 26, and 28-30);

(3) under 35 U.S.C. §102(b) as anticipated by U.S. Patent No. 5,519,635 to Miyake et al., **a newly cited reference** (claims 1, 3, 25 and 28);

(4) under 35 U.S.C. §102(e) as anticipated by U.S. Patent No. 5,989,402 to Chow et al., **also a newly cited reference** (claims 1, 3, 25 and 28);

(5) under 35 U.S.C. §102(e) as anticipated by U.S. Patent No. 6,090,251 to Sundberg et al., **another newly cited reference** (claims 1-4, 6-9, 25-26 and 28);

(6) under 35 U.S.C. §102(a) as anticipated by WO 97/44132, **another newly cited reference**;

(7) under 35 U.S.C. §103(a) as obvious over Miyake et al. (again, a newly cited reference) or WO 97/44132 in view of U.S. Patent No. 5,571,410 to Swedberg et al. (claims 2, 4-9, 26 and 29-30); and

(8) under 35 U.S.C. §103(a) as obvious over Miyake et al. (newly cited, as above) or WO 97/44132 in view of Swedberg et al. and in further view of U.S. Patent No. 5,641,400 to Kaltenbach et al. (claims 10-12).

In addition, the Examiner objected to the drawings under 37 C.F.R. §1.83(a).

Withdrawal of the previous grounds of rejection over U.S. Patent Nos. 4,806,316 to Johnson et al., 6,103,199 to Bjornsen et al., 4,654,127 to Baker et al., and 5,968,331 to Kambara et al. is acknowledged with appreciation.

The aforementioned grounds of rejection are addressed in part by the present amendments and are otherwise traversed for reasons that will be discussed in detail herein. In addition, applicants **request the Examiner to reconsider and withdraw the finality of the Office Action** pursuant to the provisions of Section 706.07(a) of the M.P.E.P., as discussed below.

With the present amendments, claim 29 has been canceled, and claims 1, 25 and 28 have been amended. Thus, claims 1-12, 25, 26, 28 and 30 are now pending.

REQUEST FOR WITHDRAWAL OF FINALITY:

Applicants respectfully request the Examiner to reconsider and withdraw the finality of the Office Action under reply. This request is made pursuant to M.P.E.P. §706.07(a), which provides, in part, that second actions on the merits are not to be made final when an examiner introduces a new ground of rejection that:

(1) is not necessitated by applicant's amendment of the claims; or

(2) is not based on references cited in an information disclosure statement filed under 37 C.F.R. §1.97(c).

In the present case, the Examiner has issued **eight** new grounds of rejection under 35 U.S.C. §§102 and 103, over four newly cited references, Miyake et al., Chow et al., Sundberg et al. and WO 97/44132. The newly cited references are no more relevant to the previously amended claims than to the claims as originally filed. This is particularly true in view of the examiner's characterization of the references, which indicates that any one of the newly cited references could have been cited in the initial Action against the originally filed claims.

Since the four newly cited references are no more applicable to the present claims than to the claims as originally filed, the previous amendments did not necessitate the new grounds of rejection, and finality is improper. Applicants ask that the Examiner reconsider the issue and withdraw finality.

THE ABOVE AMENDMENTS:

Applicants would like to thank Examiner Bex for her time and consideration in extending a telephone interview to the undersigned attorney on November 8, 2001, in which she clarified the above rejections. Pursuant to the Examiner's suggestions in the interview, claims 1, 25 and 28 have been amended to clarify that the invention is directed to a modular apparatus for the chemical analysis of an analyte, wherein the apparatus includes a plurality of separation units, wherein each unit is a solid substrate having a microchannel present in the surface thereof,

wherein each microchannel is of a different length. Claim 29 has been canceled to eliminate redundancy. The claimed apparatus also includes a **reservoir unit that can be operatively and modularly connected to each separation unit in succession**. When the reservoir unit is connected to a separation unit, an external power source facilitates delivery of liquid from a reservoir contained in the reservoir unit in the form of a plate into the microchannel of the separation unit.

Support for these amendments can be found throughout the application as filed. For example, it is disclosed on page 3, line 19 through page 4, line 2 that a wide variety of apparatus components, and component dimensions, can be used, such that a skilled person can pick and choose among them for any particular application. It is also disclosed that the separation units, each with a microchannel of a different length, can be coupled to the same reservoir unit. In addition, as described on page 5, line 22 to page 6, line 7, the modular nature of this apparatus allows for substitution of different components within a given modular apparatus to accommodate the specific needs associated with analyzing a particular sample. FIG. 7 and the accompanying text on page 10, line 16, to page 12, line 2 disclose a reservoir unit in the form of a plate. Furthermore, external power sources or "units" are described on page 12, lines 2 to 10. Thus, all pending claims are fully supported by the original disclosure of the application, and no new matter has been added.

REJECTION UNDER 35 U.S.C. §112, FIRST PARAGRAPH:

Claims 1 and 25 stand rejected under 35 U.S.C. § 112, first paragraph, as containing subject matter not described in the specification in such a way as to reasonably convey that the inventors had possession of the claimed invention. Specifically, the Examiner objected to the introduction of an additional separation unit. In addition, the "Examiner contends that a reservoir unit which is simultaneously coupled to a plurality of separation units, was not adequately disclosed within the instant specification." Furthermore, the Examiner stated that FIGS. 1, 2, 7B and 8 clearly indicate the use of a single separation unit connected to the reservoir unit.

As an initial matter, the applicants disagree with the Examiner's contention that the application as filed does not support an apparatus comprised of a plurality of separation units. As recognized by the Examiner, it is disclosed on page 3, line 22 to page 4, line 2 that "the skilled person may choose **a separation unit with a microchannel of a particular length** and size for the analysis of a particular sample and choose **a separation unit with a microchannel of a different length** and sized for a different sample, but choose the same reservoir unit, power unit, hearing unit, etc. for the analysis of both samples." (Emphasis added). Clearly, this passage supports claims reciting a plurality of separation units, wherein each separation unit has a microchannel and each microchannel is of a different length.

In addition, the applicants point out that the term "simultaneous" is nowhere to be found in any of the rejected claims. That is, none of the rejected claims requires that the reservoir unit be simultaneously coupled to a plurality of separation units. Thus, it is unclear why the Examiner raises "simultaneous coupling" as an issue.

In the interest of expediting prosecution, the applicants have further amended the claims to clarify the modular nature of the invention. All claims now recite that the reservoir unit has **dimensions compatible for operative coupling to each of a plurality of separation units in succession**. This claim element is supported in the application as filed. For example, FIGS. 1, 2, 7B and 8, as pointed out by the Examiner, indicate the use of a **single** separation unit connected to the reservoir unit. In addition, as discussed above "the skilled person may choose a separation unit with a microchannel of a particular length and size for the analysis of a particular sample and choose a separation unit with a microchannel of a different length and sized for a different sample, but **choose the same reservoir unit**, power unit, hearing unit, etc. for the analysis of both samples" (emphasis added). Thus, reservoir units having dimensions compatible for operative coupling to a separation unit at a time is clearly supported by the application as filed.

Thus, the pending claims are clearly directed to subject matter that reasonably conveys to one of ordinary skill in the art that the inventors had possession of the claimed invention when the application was filed. Accordingly, applicants respectfully request reconsideration and withdrawal of the rejection.

THE REJECTION UNDER 35 U.S.C. §112, SECOND PARAGRAPH:

Claims 1-12, 25, 26 and 28-30 stand rejected under 35 U.S.C. § 112, second paragraph, as indefinite for failing to particularly point out and distinctly claim the subject matter that applicants regard as the invention. Specifically, the Examiner has stated that the term "may be" is indefinite. In addition, the Examiner states that the terms "adapted to" and "capable of" are not positive recitations and do constitute limitations. While not wishing to acquiesce in the rejection, but for the sole purpose of expediting prosecution, the objected-to terminology has been removed from the claims. Accordingly, reconsideration and withdrawal of this rejection is respectfully requested as well.

THE 35 U.S.C. §102(B) REJECTION OVER MIYAKE ET AL.:

Claims 1, 3, 25 and 28 stand rejected as anticipated by Miyake et al., newly cited In issuing this rejection, the Examiner contends that Miyake et al. teaches an apparatus for chemical analysis with multiple detachable separation units that may be coupled to a reservoir unit either sequentially or in parallel. In addition, the Examiner states that this patent discloses a driving unit for supplying or driving liquid from the reservoir unit to a microchannel of each separation unit.

It is axiomatic that for a reference to anticipate a claim, the reference must disclose each and every element of the claim. *In re Spada,* 15 USPQ2d 1655 (Fed. Cir. 1990). Unless there is "identity of invention," such that all claim elements are disclosed in a single reference, there can be no anticipation under 35 U.S.C. §102. For the following reasons, applicants respectfully submit that Miyake et al. does not disclose each and every element of the invention as recited in the pending claims, and therefore cannot anticipate the claimed invention.

As discussed above, the invention is directed to a **modular microchannel apparatus system** for chemical analysis of an analyte that is neither explicitly nor implicitly disclosed in Miyake et al. That is, the invention is directed to a modular apparatus for analyte analysis that includes a plurality of separation units, wherein each unit includes a microchannel and each microchannel is of a different length. Miyake et al., on the other hand, contains no disclosure

relating to separation units with microchannels of different lengths and therefore cannot anticipate the pending claims. Accordingly, applicants request reconsideration and withdrawal of the rejection over Miyake et al.

THE 35 U.S.C. §102(E) REJECTION OVER CHOW ET AL.:

Claims 1, 3, 25 and 28 are also rejected as anticipated by Chow et al., newly cited. In issuing this rejection, the Examiner asserts that Chow et al. teaches a microfluidic separation unit comprising a replaceable separation unit having a microfluidic channel. The Examiner also contends that the patent discloses a single reservoir unit having a plurality of reservoirs containing a liquid, as well as an external power unit coupled to a probe that applies a driving force from the reservoir to the microchannel of the separation unit. The Examiner also states that a support plate and a membrane or gasket are also disclosed.

As discussed above, the pending claims are directed to a modular microchannel apparatus system for chemical analysis of an analyte, wherein the apparatus includes a plurality of separation units wherein each unit has a microchannel of a different length. Chow et al. contains no disclosure relating to a plurality of separation units or microchannels of different lengths. In addition, there is no mention a single reservoir unit that may be operatively and modularly connected to one separation unit at a time. Although the Examiner refers to "a single reservoir unit having a plurality of reservoirs 24 containing a liquid," the term "reservoirs 24" as described in Chow et al. represents "apertures, holes or ports." *See* column 6, lines 28-33. As such, they do not **contain** liquids but rather serve to "facilitate fluid or material introduction into the channels or chamber of the interior portion of the device, as well as providing ports at which electrodes may be placed into contact with fluids within the device." *See* column 6, lines 44-51. Thus, Chow et al. does not anticipate the pending claims, and the applicants respectfully request withdrawal of this rejection as well.

THE 35 U.S.C. §102(E) REJECTION OVER SUNDBERG ET AL.:

Claims 1-4, 4-9, 25-26 and 28 also stand rejected as anticipated by Sundberg et al., newly cited. In issuing this rejection, the Examiner asserts that Sundberg et al. teaches a

microfabricated structure for facilitating the introduction of fluids into a microfluidic device. According to the Examiner, a reservoir unit is provided as well as a plurality of interchangeable separation chip-shaped devices that contain channels. In addition, the Examiner states that Sundberg et al. teaches the use of an external power unit for driving the liquid from the reservoir through the reservoir unit into the microchannel of the separation device via electrodes.

A careful reading of the specification makes clear that this patent discloses neither a plurality of separation units wherein each unit has a microchannel of a different length, nor a single reservoir unit that may be operatively and modularly connected to one separation unit at a time. In addition, although the Examiner refers to "interchangeable separation devices 44," "44" is the reference number for a "fluid removal system." *See* column 5, line 39-42. Applicants respectfully submit that the Examiner's characterization of a "fluid removal system" as an "interchangeable separation device" is in error. In addition, while the Examiner asserts that "channels 18" are formed in "separation devices 44," applicants are unable to find any figures of Sundberg et al. that contain both "channels 18" and "separation devices 44," or any disclosure in the text of Sundberg et al. supporting this assertion. Thus, Sundberg et al. does not anticipate the pending claims, and applicants respectfully request withdrawal of this rejection as well.

THE 35 U.S.C. §102(A) REJECTION OVER WO 97/44132 TO LOUX ET AL.:

Claims 1, 3, 25 and 28 stand rejected as anticipated by Loux et al., WO 97/44132, also newly cited. In issuing this rejection, the Examiner asserts that this reference teaches a modular housing assembly for a micromachined fluid handling structure. According to the Examiner, the reference discloses a system that uses a plurality of separation units each having a microchannel in combination with a single reservoir unit comprising a plurality of reservoirs. The Examiner further states that the system is easily disassembled with the reservoir plate being easily separated from the separation unit, and, further, that the system may include a modular heater assembly and a power unit.

As an initial matter, applicants do not agree that the separation units disclosed in WO 97/44132 anticipate the pending claims. As discussed above, the present invention is directed to a modular apparatus for analyte analysis that includes a plurality of separation units, wherein

each unit includes a microchannel and each microchannel is of a different length. The cited reference, on the other hand, contains no disclosure relating to microchannels of different lengths and therefore cannot anticipate the pending claims. Accordingly, applicants request reconsideration and withdrawal of this rejection.

THE 35 U.S.C. §103(A) REJECTION OVER MIYAKE ET AL. OR WO 97/44132 IN VIEW OF SWEDBERG ET AL.:

Claims 2, 4-9, 26 and 29-30 stand rejected as obvious over Miyake et al. or WO 97/44132 (both newly cited) in view of Swedberg et al. The Examiner states that neither Miyake et al. nor WO 97/44132 teaches a separation unit formed from a planar first and second half, wherein at least one of the halves has a microchannel formed therein. However, the Examiner contends that Swedberg et al. provides such a teaching and that it would have been obvious to include the separation unit of Swedberg et al. in the system of the Miyake et al. or WO 97/44132 in order to derive a sample processing compartment featuring enhanced symmetry and axial alignment.

Applicants submit that the three basic criteria for *prima facie* obviousness have not been met. Here, the references do not teach or suggest the claimed invention, even in combination. That is, the combination does not teach or suggest a modular separation apparatus that includes a reservoir unit and a plurality of separation units that can be coupled to the reservoir unit one at a time, wherein **each unit has a microchannel of a different length**. For example, neither Swedberg et al. nor WO 97/44132 discloses a plurality of separation units. Miyake et al. is the only reference that describes a plurality of separation units. Upon closer examination of Miyake et al., however, it is clear that when a plurality of separation units is employed, they are identical in construction. As depicted in FIGS. 1, 12 and 15, the separation units have an identical external (FIG. 1) and internal (FIGS. 12 and 15) construction. Thus, even if it were proper to read the three references together, the combination would result in an apparatus with a plurality of **identical** separation units not an apparatus as claimed by applicants, wherein each separation unit is different. Identical separation units may arguably allow **the same separation procedure**

to be repeated, identical separation units perform the same function. Accordingly, there is no reason why any particular separation unit would be chosen over another.

The presently claimed invention, on the other hand, includes a plurality of separation units having microchannels of different lengths. As discussed above, a separation unit of a particular length may be selected according to the particular sample. This provides a greater flexibility in tailoring the separation process according to the particular sample. For example, a separation unit having a longer microchannel may be selected for a sample if a shorter separation unit is found unsuitable. Thus, an apparatus comprising a plurality of separation units having microchannels of different lengths that can each be modularly and operatively coupled to the same reservoir unit is not obvious over the cited references, and reconsideration and withdrawal of the rejection is accordingly respectfully requested.

THE 35 U.S.C. §103(A) REJECTION OVER MIYAKE ET AL. OR WO 97/44132 IN VIEW OF SWEDBERG ET AL. AND IN FURTHER VIEW OF KALTENBACH ET AL.:

Claims 10-12 stand rejected as obvious over Miyake et al. or WO 97/44132 in view of Swedberg et al. as applied to claim 26 and further in view of Kaltenbach et al. The Examiner states that neither Miyake et al., WO 97/44132, nor Swedberg et al. teaches a peltier plate operatively and modularly coupled to the support plate for controlling the temperature thereof. However, the Examiner contends that Kaltenbach et al. provides such a teaching and that it would have been obvious to include the peltier plate of Kaltenbach et al in order to influence the physical and chemical parameters involved in separation techniques and decrease the time needed to perform separation.

Again, Kaltenbach et al. does not teach a plurality of separation units. Thus, the claims now set forth an invention that is neither taught nor suggested by the combination of the cited references. That is, the combination does not provide **a plurality of separation units wherein each unit has a microchannel of a different length**. The benefit of improved flexibility as discussed above is still absent. Accordingly, by failing to teach or suggest all the claim limitation, the references do not render the invention obvious. Accordingly, withdrawal of the rejection is warranted.

THE OBJECTIONS TO THE DRAWINGS

The Examiner has objected to the drawings under 37 C.F.R. §1.83(a) as failing to show every feature of the invention set forth in the claims. That is, the Examiner asserts that no single drawing shows "at least two separation units" as set forth in the claims. Thus, the Examiner required either new drawings or the elimination of the feature "at least two separation units" from the claims.

With the above amendments, this objection is no longer applicable. In addition, the applicants point out that 37 C.F.R. §1.81(a) provides that drawings are not required when unnecessary for the understanding of the subject matter sought to be patented. Here, the drawings are not needed for the understanding of the pending claims and are provided only to supplement to the disclosure of the written specification. Thus, no changes are presently needed. In addition, as various separation units are illustrated in FIGS. 1, 2 and 7, a plurality of separation units is shown in the drawings as a whole. Accordingly, if necessary, applicants will provide corrected drawings upon allowance of the claims without introducing new matter.

CONCLUSION

For all of the above reasons, it is submitted that the application comports with all requirements of 35 U.S.C. §112, and that the pending claims define an invention that is patentable over the art. As the application should now be in condition for allowance, a prompt indication to that effect would be appreciated.

If the Examiner have any questions concerning this communication, she is welcome to contact Michael Beck at (650) 485-3864.

Respectfully submitted,

Dec 10, 2001 By: Louis L. Wu

Date

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APPENDIX A
CLAIM AMENDMENTS

1. (Amended Five Times) A modular microchannel apparatus for the chemical analysis of an analyte in a sample, comprising:

(a) ~~at least two~~ a plurality of separation units each comprised of a solid substrate having a ~~including (i)~~ a microchannel present in the surface thereof, wherein the microchannel in each separation unit is of a different length~~through which a sample comprising an analyte may be driven in a determinable time period, said time period indicative of molecular characteristics of the analyte, (ii) an inlet allowing input of liquid into the microchannel, and (iii) an outlet allowing removal of liquid from the microchannel~~;

(b) a single reservoir unit in the form of a plate comprised of a reservoir ~~adapted to contain~~ that contains a liquid for introduction into the microchannel in each of the separation units~~through the inlet and into the microchannel of each separation unit, the reservoir having dimensions that enable successive operative and modular coupling to each separation unit so as to allow transfer of liquid from the reservoir unit into the microchannel of each separation unit, thereby enabling chemical analysis to be carried out in each of a plurality of separation units using the single reservoir unit;~~ and

(c) an external power ~~unit~~ source operatively connected to the reservoir unit for driving the liquid from the reservoir ~~into and through the microchannel of each separation unit~~ through the microchannels of the separation units,

wherein the reservoir unit has dimensions that enable the operative and modular coupling of the reservoir to each separation unit in succession to allow liquid from the reservoir unit to be driven, by the external power source, into the microchannel of the separation unit that is operatively and modularly coupled to the reservoir unit.

25. (Amended Four Times) A kit for making a modular microchannel apparatus for the chemical analysis of an analyte in a sample, comprising:

(a) ~~at least two~~ a plurality of separation units each comprised of a solid substrate having ~~including (i)~~ a microchannel a microchannel present in the surface thereof, wherein the microchannel in each separation unit is of a different length~~through which a sample comprising an analyte may be driven in a determinable time period, said time period indicative of molecular characteristics of the analyte, (ii) an inlet allowing input of liquid into the microchannel, and (iii) an outlet allowing removal of liquid from the microchannel~~;

(b) a single reservoir unit in the form of a plate comprised of a reservoir ~~adapted to contain~~ that contains a liquid for introduction into the microchannels of the separation units~~through the inlet and into the microchannel of each separation unit, the reservoir having dimensions that enable successive operative and modular coupling to each separation unit so as to allow transfer of liquid from the reservoir unit into the microchannel of each separation unit, thereby enabling chemical analysis to be carried out in each of a plurality of separation units using the single reservoir unit~~; and

(c) an external power ~~unit~~ source having dimensions that enable its operative connection ~~operatively connected~~ to the reservoir unit for driving the liquid from the reservoir ~~into and through the microchannel of each separation unit~~ through the microchannels of the separation units,

wherein the reservoir unit has dimensions that enable the operative and modular coupling of the reservoir unit to each separation unit in succession and to the external power source to drive liquid from the reservoir into the microchannel of the separation unit operatively and modularly coupled to the reservoir unit.

28. (Amended) A modular microdevice for analyte analysis, comprising:

(a) a plurality of separation units each comprised of a solid substrate having~~including (i)~~ a microchannel present in the surface thereof, wherient he microchannel in each separation unit is of a different length~~through which a sample comprising an analyte may be driven in a determinable time period, said time period indicative of molecular characteristics of the analyte, (ii) a plurality of inlets allowing input of liquid into the microchannel, and (iii) at least one outlet allowing removal of liquid from the microchannel~~;

(b) a single reservoir unit in the form of a plate comprised of a plurality of reservoirs, wherein each reservoir contains a liquid for introduction into a microchannel of a separation unit ~~is adapted to contain a liquid for introduction through a corresponding inlet into the microchannel of each separation unit, and further wherein each reservoir is capable of operatively and modularly coupling to each separation unit in succession so as to allow transfer of liquid from the reservoir unit into the microchannel of each separation unit, thereby enabling chemical analysis to be carried out in each of a plurality of separation units using the single reservoir unit~~; and

(c) an external power ~~unit~~ source operatively connected to the reservoir unit for driving liquids from the reservoir unit through the microchannels of the separation units ~~the liquid from each reservoir into and through the microchannel of each separation unit~~

wherein the reservoir unit has dimensions that enable the operative and modular coupling of the reservoir unit to each separation unit in succession to allow liquid from at least one of the plurality of reservoirs to be driven, by the external power source, into the microchannel of the separation unit that is operatively and modularly coupled to the reservoir unit.

APPENDIX B

PENDING CLAIMS UPON ENTRY OF THE AMENDMENT

1. A modular microchannel apparatus for the chemical analysis of an analyte in a sample, comprising:

(a) a plurality of separation units each comprised of a solid substrate having a microchannel present in the surface thereof, wherein the microchannel in each separation unit is of a different length;

(b) a single reservoir unit in the form of a plate comprised of a reservoir that contains a liquid for introduction into the microchannels of the separation units; and

(c) an external power source operatively connected to the reservoir unit for driving the liquid from the reservoir through the microchannels of the separation units,

wherein the reservoir unit has dimensions that enable the operative and modular coupling of the reservoir unit to each separation unit in succession to allow liquid from the reservoir to be driven, by the external power source, into the microchannel of the separation unit that is operatively and modularly coupled to the reservoir unit.

2. An apparatus according to claim 1, wherein at least one of the separation units is chip-shaped and formed from a first half and a second half each having a substantially planar surface facing and joining the other half, wherein at least one of the planar surfaces has a channel thereon such the joining of the two surfaces forms the microchannel.

3. An apparatus according to claim 1, wherein at least one of the separation units has one or more openings leading to the microchannel capable of admitting liquid reagents such that when the separation unit and the reservoir unit are operatively and modularly coupled, the openings are aligned with the reservoirs thereby allowing the liquid reagents and the analyte to pass from the reservoirs into the microchannel without substantial leakage.

4. An apparatus according to claim 2, wherein at least one of the separation units includes a substrate comprised of a material other than silicon or silicon dioxide in which the first microchannel is formed by laser ablation.

5. An apparatus according to claim 2, wherein the reservoir unit includes a membrane that covers at least one of the reservoirs confining the prepackaged liquid reagent therein, wherein the membrane is penetrable with a probe for applying a driving force to drive movement of liquid reagent and analyte from the reservoir through the microchannel of at least one of the separation units.

6. An apparatus according to claim 2, wherein both substantially planar surfaces of the separation unit having a first half and a second half have a laser-ablated channel thereon and the two channels join to form the microchannel.

7. An apparatus according to claim 2, wherein the channel of at least one separation unit is formed by laser ablation.

8. An apparatus according to claim 2, wherein the external power unit comprises a powering plate operatively and modularly coupled to the reservoir unit, the powering plate having an electrical connection to the reservoir to provide a driving force to drive movement of the liquid reagents and analyte from the reservoir through the microchannel.

9. An apparatus according to claim 8, wherein the power plate comprises probes for inserting into at least one of the reservoirs to provide electrical connection thereto.

10. An apparatus according to claim 26, further comprising a peltier plate operatively and modularly coupled to the support plate for controlling the temperature of at least one of the separation units.

11. An apparatus according of claim 10, wherein the peltier plate can be used to heat or cool at least one of the separation units by selecting an appropriate mode of operation.

12. An apparatus according to claim 11, further comprising a heat exchanger operatively connected to the peltier plate to transfer heat between the peltier plate and the surrounding environment.

25. A kit for making a modular microchannel apparatus for the chemical analysis of an analyte in a sample, comprising:

(a) a plurality of separation units each comprised of a solid substrate having a microchannel present in the surface thereof, wherein the microchannel in each separation unit is of a different length;

(b) a single reservoir unit in the form of a plate comprised of a reservoir that contains a liquid for introduction into the microchannels of the separation units; and

(c) an external power source having dimensions that enable its modular and operative connection to the reservoir unit for driving the liquid from the reservoir through the microchannels of the separation units,

wherein the reservoir unit has dimensions that enable the operative and modular coupling of the reservoir unit to each separation unit in succession and to the external power source to drive liquid from the reservoir into the microchannel of the separation unit that is operatively and modularly coupled to the reservoir unit.

26. The apparatus according to claim 9, further comprising a support plate for operatively and modularly coupling to the separation units.--

28. A modular microdevice for analyte analysis, comprising:

(a) a plurality of separation units each comprised of a solid substrate having a microchannel present in the surface thereof, wherein the microchannel in each separation unit is of a different length;

(b) a single reservoir unit in the form of a plate comprised of a plurality of reservoirs, wherein each reservoir contains a liquid for introduction into a microchannel of a separation unit; and

(c) an external power source operatively connected to the reservoir unit for driving liquids from the reservoir unit through the microchannels of the separation units,

wherein the reservoir unit has dimensions that enable the operative and modular coupling of the reservoir unit to each separation unit in succession to allow liquid from at least one of the plurality of reservoirs to be driven, by the external power source, into the microchannel of the separation unit that is operatively and modularly coupled to the reservoir unit.

30. The modular microchannel apparatus system of claim 28, wherein each of two separation units of the plurality has a microchannel of a different size.